

## Claims

1. An aqueous dispersion comprising a silicon-aluminium mixed oxide powder, wherein said silicon-aluminium mixed oxide powder comprises from 0.1 to 99.9 wt.%  $\text{Al}_2\text{O}_3$  and has a structure containing Si-O-Al- bonds and at least one selected from the group consisting of amorphous silicon dioxide regions, crystalline silicon dioxide regions, and combinations of amorphous and crystalline silicon dioxide regions, and crystalline aluminium oxide regions.

2. The aqueous dispersion according to claim 1, wherein the powder comprises primary particles of amorphous silicon dioxide and crystalline aluminium oxide obtained from a flame hydrolysis process.

3. The aqueous dispersion according to claim 1, wherein the silicon-aluminium mixed oxide has a mullite structure having the chemical composition  $3 \text{Al}_2\text{O}_3 \times 2 \text{SiO}_2$  up to  $2 \text{Al}_2\text{O}_3 \times \text{SiO}_2$ .

4. The aqueous dispersion according to claim 1, further comprising aluminium oxide doped with silicon dioxide or silicon dioxide obtained from a flame hydrolysis process and doped with aluminium oxide.

5. The aqueous dispersion according to claim 1, further comprising aluminium oxide powder completely or partially coated with silicon dioxide or silicon dioxide powder completely or partially coated with aluminium oxide.

6. The aqueous dispersion according to claim 1, wherein the crystalline aluminium oxide regions comprise crystalline aluminum oxide selected from the group consisting of alpha-aluminium oxide, gamma-aluminium oxide, delta-aluminium oxide, theta-aluminium oxide, kappa-aluminium oxide, pyrogenically produced aluminium oxide and mixtures thereof.

7. The aqueous dispersion according to claim 1, wherein the specific surface area of the powder is between 5 and 300  $\text{m}^2/\text{g}$ .

8. The aqueous dispersion according to claim 1, wherein a solids content in the dispersion is between 0.1 and 70 wt.%.

9. The aqueous dispersion according to claim 1, wherein the pH value of the dispersion is between 4 and 12.5.

5 10. The aqueous dispersion according to claim 1, further comprising an oxidising agent selected from the group consisting of hydrogen peroxide, hydrogen peroxide adducts, organic peracids, inorganic peracids, imino peracids, persulfates, perborates, percarbonates, oxidising metal salts  
10 and mixtures thereof.

11. The aqueous dispersion according to claim 1, further comprising an oxidation activator selected from the group consisting of metal salts of Ag, Co, Cr, Cu, Fe, Mo, Mn, Ni, Os, Pd, Ru, Sn, Ti, V, carboxylic acids, nitriles, ureas,  
15 amides, esters and mixtures thereof.

12. The aqueous dispersion according to claim 1, further comprising a corrosion inhibitor selected from the group consisting of benzotriazoles, substituted benzimidazoles, substituted pyrazines, substituted pyrazoles and mixtures  
20 thereof.

13. The aqueous dispersion according to claim 1, further comprising non-ionic amphoteric surface-active substances, cationic amphoteric surface-active substances, anionic amphoteric surface-active substances, amphoteric surface-  
25 active substances and mixtures thereof.

14. A process for producing the aqueous dispersion according to claim 1, said process comprising  
dispersing the silicon-aluminium mixed oxide in an aqueous medium,  
30 wherein an energy input is at least 200 KJ/m<sup>3</sup>.

15. The process for producing the aqueous dispersion according to claim 14, wherein the silicon-aluminum mixed oxide is dispersed and ground by pressurizing and releasing one or more aqueous dispersions of the silicon-aluminum mixed

oxide through a nozzle of a device to cause the one or more aqueous dispersions to collide with one another or a section of a wall of the device.

16. A process for chemical mechanical polishing a  
5 surface, said process comprising  
polishing said surface with the aqueous dispersion  
claimed in claim 1.

17. The process as claimed in claim 16, wherein the  
surface is an oxide surface.

10 18. A process for chemical mechanical polishing a metal  
coating, said process comprising  
polishing said metal coating with the aqueous dispersion  
claimed in claim 1.

15 19. The process as claimed in claim 18, wherein the  
metal coating is selected from the group consisting of  
aluminum, aluminum alloys, copper, copper alloys, tungsten,  
titanium and titanium nitride.

20 20. A surface coating comprising the aqueous dispersion  
claimed in claim 1.

21. A process for producing a surface coating, said  
process comprising  
incorporating the aqueous dispersion claimed in claim 1  
in said surface coating.